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MEMORANDUM TO FILE:

25X1A9A **FROM:**

SUBJECT: Report on Trip to Fort Belvoir

Purpose of Trip

Some months ago, comments were received from personnel returning from overseas tours relative to poor performance from engine generator sets. Questioning as to the meaning of "poor performance" established that in field use, some of the diesel generators had very poor frequency and voltage regulation when intermittent heavy loads (30 to 50% of rated capacity) were applied to the machines. This condition was very pronounced when, as for example, a 15 KW transmitter was keyed causing surge loading of a 60 KW machine.

After preliminary study, it was decided to check with the Signal Corps, U. S. Army, to see if they had, in like manner, experienced any similar difficulties with engine-generator sets. A letter was written to the E&D Branch, OC Sig. O, Dept of Army, Wash., and they referred our letter to the Corps of Engineers. Contact with the Corps revealed that they had experienced the aforementioned difficulty with engine generator sets and could discuss the matter provided proper security clearances were obtained.

Arrangements were made by Mr. OC-E for a visit to Fort Belvoir, Va. for the purpose of discussing with Mr. McGarrity, Chief, Electrical Power Branch, ERDL, the problem outlined above, as well as any new development of electrical or mechanical governing devices for use on engine driven power sources. The letter granting approval for this meeting is shown as attachment A.

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Results Obtained

On Tuesday, 22 Nov. 1955 at 10:00 a.m. Mr. OC-E, met with Mr. J. W. McGarrity and Mr. David Ginsberg in Room C-113 Main Laboratory Building, ERDL, Fort Belvoir, Virginia to discuss their developments with voltage and frequency control devices as well as any suggestions they may have relative to our problems.

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The discussion opened with a statement regarding our problem and technical data required for a machine to solve this difficulty.

Mr. McGarrity then outlined a 45KW, 50/60 cycle, 208/240 or 416/480 volt Diesel driven generator developed by the Corps of Army Field Forces Artillery (Guided Missile) Projects. This machine has been field

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tested by the Army for 1 year under all kinds of conditions, and they believe this type machine should be their standard generator.

The general technical data on this generator, as well as test results, are included as attachment B.

The rapid control feature of this machine is based upon the alternator design. These alternators are of the salient-pole type manufactured by G.E. and are controlled by static exciters and static voltage regulators. The static exciters and voltage regulators use magnetic amplifiers and this eliminate commutators, moving parts, rotating devices and arcing contacts from the excitation and regulation system.

The magnetic amplifiers in turn control, thru hydraulic power, the engine throttle and the engine power source. General descriptive data on this electric governor is given in attachment C.

The cost of this 43 KW, 60 cycle unit, completely winterized, is \$10,000.00. Information relative to procurement may be obtained from Colonel C. T. Newton, Chief, Engineering Research and Development Division, Corps of Engineers.

Another item mentioned by Mr. Ginsberg as being in the development stages was a gas turbine driven, 400 cycle 100 kilowatt unit. This generator (not including gas turbine prime mover) was not much larger than a starting motor on a high priced automobile.

Conclusions and Recommendations:

1. It is recommended that contact be made with General Electric and Westinghouse to determine the extent to which they plan to develop and produce this type of static exciter alternator electric governor system as it seems capable at this point of being adaptable to all types of engine driven generator sets.
2. In view of our existing generator Standardization program, it is recommended that serious consideration be given to evaluating this system as a possible future standard of stock engine-generator sets.

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